

A NEW MALARIA PARASITE OF MAN

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(Received for publication 3 October, 1922)

PLATE XVI

During the course of experimental work on the treatment of malaria, carried out at the Liverpool School of Tropical Medicine from 1917 to 1921, it was the practice always to control the clinical results of treatment by microscopical blood examinations.

Occasionally—perhaps some half-dozen times—parasites other than ‘ring’ forms were found in films, and doubt arose as to whether they were quartan or simple tertian.

The present paper concerns the parasites found in one such case.

Private J.—, 188817.

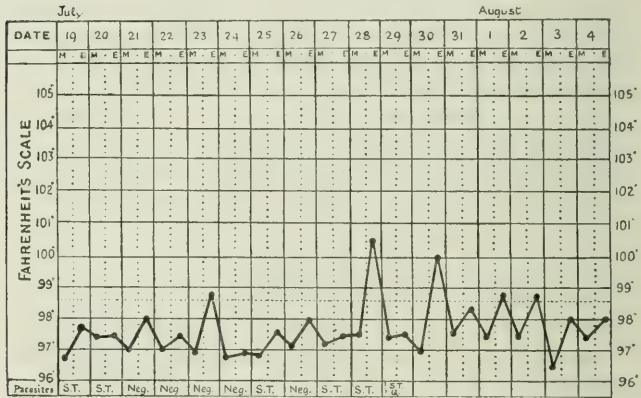
December, 1916	...	...	‘Malaria,’ East Africa.
January, 1918	...	...	Left East Africa.
8.4.18 to 11.4.18	...	...	The blood films for these dates, made for the purpose of counting the leucocytes, are still in existence and show Simple Tertian parasites.
and 27.7.18 to 4.5.18			
19.7.18 to 20.7.18	...	...	The films still in existence show Simple Tertian parasites.
21.7.18 to 24.7.18	...	...	The entry made in the Card Index was ‘Negative.’
28.7.18	...	...	The entry was ‘? Simple Tertian.’
29.7.18	...	...	The entry was ‘? Simple Tertian, ? Quartan.’

A re-examination of these two latter films, still in existence, show peculiar forms.

30.7.18 to 3.8.18	Owing to the doubt as to the nature of the parasites found, and from the fact that this was not the first time that such doubt had arisen, a series of films approximately at 4-hourly intervals during the daytime was made on the above dates. They were stained for 1 hour with Leishman’s stain, and show perfectly well at the present time the characters to be described.
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The Temperature Chart of 28.7.18 to 30.7.18 (fig. 1) shows a tertian periodicity, and the parasite findings for these days are as follows :

28.7.18	9 a.m.	...	...	Young forms absent. Incompletely segmented forms with 6-8 chromatin masses.
29.7.18	...	...	...	Young forms in successive stages of growth during the day.
30.7.18	9 a.m.	...	...	Incompletely segmented forms.
	1 p.m.	...	...	Completely segmented forms and young rings.
1.8.18	2 p.m.	...	...	Completely segmented forms and young rings again present.



The periodicity of the parasite appears therefore to be tertian. Although a cycle of development is passed through from 30.7.18 to 1.8.18 the temperature on the latter date reaches only 98.8° F.

THE PARASITE

Young forms.

Small 'rings' indistinguishable from 'rings' of other species, or round or oval forms with little or no clear area ('vacuole') around the nucleus. No indication of amoeboid activity as judged by irregularity of form. The red cells in which the parasites occur are not uncommonly oval with irregular margins—*fimbriated*. At this stage the cells are not enlarged and (generally) show no Schüffner's dots.

Medium-sized forms.

These are the characteristic forms. They resemble rather closely quartan parasites in the appearance they present of 'solidity' or 'compactness,' and the amount of chromatin and the distribution of the pigment in a lateral band are appearances that recall quartan, but no band-like or 'meridional' forms, as seen in the case of the quartan parasite, were found. They are globular or oval, and occur so frequently in *oval* red cells that it can hardly be a matter of chance but one of actual significance. In forms with one chromatin mass this is often lateral and roughly triangular. There is a complete absence of the irregular, fantastic, 'stragglings' parasitic forms occurring in cells of not uncommonly twice the normal diameter so characteristic of simple tertian parasites. Schüffner's dots are now well marked.

Segmenting forms.

The gradual transition from young rings to segmenting forms can be traced with ease and certainty. The maximum number of segments (merozoites) appears to be 12. Forms occur with as few as 6 nuclear masses and with the pigment concentrated into a single mass, but it is impossible to be certain in the absence of complete segmentation of the protoplasm whether division is completed. The cell in which these forms lie is either normal in size or slightly enlarged. A slight margin showing Schüffner's dots is often seen, and the cell is clearly decolorized.

The characteristics then of this parasite so far as concerns the medium forms are a non-amoeboid, pigmented, compact, round or oval parasite, resembling quartan, in a red cell showing Schüffner's dots, which is either normal in size or only slightly enlarged. The pigment, so far as can be judged in stained specimens, appears to be brownish black, and granular rather than spicular. A double infection of a red cell was only seen once, viz., with 2 contiguous quarter-grown oval parasites in an oval cell.

No forms that could be interpreted as gametes were seen.

Now and then, but it has been a rare occurrence, I have encountered a form which I could not distinguish from simple tertian.

This parasite appears to resemble that found by Ahmed Emin in 1914 in the case of six pilgrims at Camaran in the Red Sea, and figured and described by him as *Plasmodium vivax*, var. *minuta*. I have been unable

to procure Ahmed Emin's specimens for examination, so cannot come to a decision as to the identity of his parasite with the present one.

The characters of this parasite appear to me to be different from any of the usually accepted species and I propose to call it *Plasmodium ovale*.

REFERENCE

- AHMED EMIN (1914). Une variété nouvelle du parasite de Laveran. *Bull. Soc. Path. Exot.*, Vol. VII., p. 385.

EXPLANATION OF PLATE XVI

Plasmodium ovale, n.sp. × 1800

Figs. 1—5. 'Ring' forms

Figs. 6—13. Medium forms.

Figs 14—22. Pre-segmenting and segmenting forms.